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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/568,191

02/13/2006

Tadashi Tomikawa

127021

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25944 7590 03/31/2011

OLIFF & BERRIDGE, PLC

P.O. BOX 320850

ALEXANDRIA, VA 22320-4850

EXAMINER

DECKER, PHILLIP

ART UNIT

PAPER NUMBER

3749

NOTIFICATION DATE

DELIVERY MODE

03/31/2011

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

OfficeAction25944@oliff.com

jarmstrong@oliff.com

Office Action Summary	Application No.	Applicant(s)	
	10/568,191	TOMIKAWA ET AL.	
	Examiner	Art Unit	
	Phillip E. Decker	3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 February 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/13/06, 3/22/07, 10/9/07, 10/17/08, 4/24/09.</u> | 6) <input type="checkbox"/> Other: _____ |

3/12/10

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statements (IDSs) submitted on 02/13/2006, 03/22/2007, 10/09/2007, 10/17/2008, 04/24/2009, and 03/12/2010 were filed in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 102c, in Fig. 6. The Office notes that reference number 10 on page 6, line 7 should probably be 102c. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet"

or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities: reference number 10 is used for more than one part. MPEP 608.01(g). In most uses, it refers to a radiating plate, for example on page 6 line 10. However, on page 6 line 7 it refers to a shoulder. There, 10 should probably be changed to 102c. Also, reference number 90 refers to an electrical connection box in most uses in the specification, for example on page 5 line 6. However on page 5 line 10 reference number 90 refers to a lower case. There, the 90 should probably be changed to 92. Appropriate correction is required.

5. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the element "vehicle board" is recited in claims 7 and 13, but does not appear in the specification. The Applicants may have intended to recite a "vehicle body" in claims 7 and 13 instead.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1 – 11 and 13 – 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The preamble of claims 1 and 12 state that the claims are drawn to a mounting structure for mounting an on-vehicle circuit unit on a vehicle body, and then recite only elements drawn to the on-vehicle circuit unit after the preamble. One could construe the phrase “for mounting an on-vehicle circuit unit on a vehicle body” as merely an intended use of the mounting structure. One could also construe the claims as for a combination (mounting structure with an on-vehicle circuit unit) and sub-combination (the on-vehicle circuit unit), with claim elements drawn to the subcombination or both the combination and subcombination. Therefore, claims 1 and 12 are indefinite.

8. Claims 4 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As written, claims 4 and 14 seem to require that the mounting part has no clearance (“is in contact with”), and simultaneously has a clearance, when fixed to a vehicle body. This renders the claim indefinite since both requirements cannot be met. If appropriate, these rejections could be obviated by replacing the phrase “in a state that the mounting part is” with the phrase – at a portion of the mounting part that is -- throughout the claims.

9. Regarding claim 5, the object of the term “it” in line 4 of the claim is ambiguous. The term “the inner surface” in line 4 of the claim is also ambiguous, since “inner

Art Unit: 3749

surface” could refer to the inner surface of the heat radiating member of claim 1 line 3 or the inner surface of the engine room of claim 5 line 3.

10. Claim 7 recites the limitation "the vehicle board" in line 3. There is insufficient antecedent basis for this limitation in the claim.

11. Regarding claim 10, where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term “radiance” in claim 10 is used by the claim to mean “emissivity”, while the accepted meaning is “flux density or radiant energy per unit area of a radiating surface” according to the Academic Press Dictionary of Science and Technology. The term is indefinite because the specification does not clearly redefine the term. MPEP 2173.05(a) III.

12. Claim 13 recites the limitation "the vehicle board" in line 5. There is insufficient antecedent basis for this limitation in the claim.

13. Claims 2 – 3, and 11 are rejected as depending from claim 1. Claims 6, 8, and 9 are rejected as depending from claim 4. Claims 15 – 17 are rejected as depending from claim 14.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claim 12 is rejected under 35 U.S.C. 102(b) as being anticipated by Dixon et al (US 5,403,782) (hereinafter "Dixon"). The specification and drawings of Dixon show all of the elements recited in claim 12 of this application. Since it cannot be determined whether the claim is for the combination or subcombination, as discussed above, the Office interprets this claim to be drawn to the subcombination, namely the on-vehicle circuit unit. Specifically, Dixon shows a circuit board having a power circuit (chip 14), and a heat radiating member (header 12, radiating at least some heat as every material does, even though the header is made of ceramic, col. 3 line 2) having an inner surface (lower surface of header 12 in Fig. 1) to which the circuit board (14) is fixed in a state of enabling heat conduction, and an outer surface (upper surface of header 12) functioning as a heat radiating surface, wherein the on-vehicle circuit unit is mounted inside an engine room of the vehicle body (which is a functional clause indicating intended use of the circuit unit and does recite structure that would differentiate it from the prior art) in a state that the heat radiating member (12) faces a surface of a battery (20) provided inside the engine room (a functional phrase indicating intended use), with a clearance being formed therebetween (d₁).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

18. Claims 1, 2, 4, 7 - 9, 11, and 14 – 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hitachi Ltd. (JP 57-59500) (hereinafter “Hitachi”) in view of Aisin AW Co. Ltd. (JP 2003-112532) (hereinafter “Aisin”). These two references, when considered together, teach all of the elements recited in claims 1, 2, 4, 7 - 9, 11, and 14 – 15 of this application.

19. Regarding claim 1, Hitachi discloses a mounting structure for mounting an on-vehicle circuit unit on a vehicle body (Fig. 1), the on-vehicle circuit unit comprising a circuit board (PCB 4) having a power circuit (electronic control circuit 1), and a heat

Art Unit: 3749

radiating member (radiator / heat sink 2) having a surface to which the circuit board is fixed in a state of enabling heat conduction (heat generating element which is heat-transmissibly coupled to a heat sink, p. 1 lines 10 - 12), and a surface functioning as a heat radiating surface (a heat sink for radiating the heat from the heat generating element, p. 1 lines 12 – 13), wherein the on-vehicle circuit unit is mounted on the vehicle body (5) in such a state that the heat radiating member faces the body with a clearance (Fig. 1). Hitachi does not disclose that the surface is an *inner* surface to which the circuit board is fixed and an *outer* surface functioning as a heat radiating surface.

20. Aisin teaches that the surface is an *inner* surface (Fig. 2, 8c) to which the circuit board (11) is fixed and an *outer* surface (8d) functioning as a heat radiating surface (paragraph [0027]). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Hitachi by adding that the heat radiating member has a circuit board on a side opposite the heat radiating side as taught by Aisin in order to expose more of the surface area of the heat radiating member to the body of the vehicle to make the heat transfer more efficient without increasing expense.

21. Regarding claim 2, Aisin teaches that the on-vehicle circuit unit (ECU 8) is mounted on the body (5) such that the body and the outer surface of the heat radiating member (8d) face each other in a substantially parallel state (Fig. 2).

22. Regarding claim 4, as best as the claim can be understood given the indefiniteness rejection above, Aisin teaches that the heat radiating member (8) has a mounting part (8a, 8b) which is to be fixed to the vehicle body (5, through bosses 6 and

7) in a state that the mounting part is in contact with the vehicle body, and the outer surface of the heat radiating member (8d), except the mounting part, faces the vehicle body with a clearance (12), in a state that the mounting part is fixed to the body (Fig. 2).

23. Regarding claim 7, Hitachi discloses that a bolt (shown in Fig. 1) is provided in the mounting part (2) and the mounting part is fixed to the vehicle board (interpreted as vehicle *body* 5) by means of a metal bolt (9, 10), but does not *explicitly* disclose that the mounting part has a bolt insertion bore. The bolt insertion bore is *implicitly* disclosed by Hitachi since Fig. 1 shows bolts passing through the mounting part and into the vehicle board, so the bolt insertion bore must be present but hidden in the figures. MPEP 2144.01.

24. Regarding claim 8, Hitachi as modified by Aisin teaches a step is provided (Hitachi Fig. 1, at the end of the lead line for reference number 2) between a surface of the mounting part which is to be in contact with the vehicle body (Hitachi radiator / heat sink 2 to the right of the bend in Fig. 1) and an outer surface of the heat radiating member (Hitachi radiator / heat sink 2 to the left of the bend in Fig. 1), such that the outer surface of the heat radiating member (Aisin 8d), except the mounting part, faces the body (Hitachi 5) with a clearance in a state that the mounting part is fixed to the body (Fig. 1).

25. Regarding claim 9, Aisin teaches that the on-vehicle circuit unit is mounted on the vehicle body (5) in a state that the mounting part (8a, 8b) faces upward (Figs 1a, 1b, and 2).

26. Regarding claim 11, Aisin teaches that the on-vehicle circuit unit is incorporated in a common electric connection box (ECU case 8) together with other circuit components (circuit board 11 containing the microcomputer, paragraph [0025]) in a state that the heat radiating member (8d) is exposed to the exterior (Fig. 2), and the entire electric connection box is mounted on the vehicle body (5, Fig. 2).

27. Regarding claim 14, Hitachi discloses an on-vehicle circuit unit comprising a circuit board (PCB 4) having a power circuit (electronic control circuit 1), and a heat radiating member (radiator / heat sink 2) having a surface to which the circuit board is fixed in a state of enabling heat conduction (heat generating element which is heat-transmissibly coupled to a heat sink, p. 1 lines 10 - 12), and a surface functioning as a heat radiating surface (a heat sink for radiating the heat from the heat generating element, p. 1 lines 12 – 13), wherein a step is provided (Fig. 1, at the end of the lead line for reference number 2) between a surface of the mounting part which is to be brought into contact with the vehicle body (radiator / heat sink 2 to the right of the bend in Fig. 1) and a surface of the heat radiating member (radiator / heat sink 2 to the left of the bend in Fig. 1), so that the surface of the heat radiating member, except the mounting part, faces the body (5) with a clearance in a state that the mounting part is fixed to the body (Fig. 1). Hitachi does not disclose that the surface is an inner surface to which the circuit board is fixed and an outer surface functioning as a heat radiating surface or the heat radiating member has a mounting part which is to be fixed to the vehicle body in a state that the mounting part is in contact with the vehicle body.

28. Aisin teaches that the surface is an *inner* surface (Fig. 2, 8c) to which the circuit board (11) is fixed and an *outer* surface (8d) functioning as a heat radiating surface (paragraph [0027]), and that the heat radiating member (8) has a mounting part (8a, 8b) which is to be fixed to the vehicle body (5, through bosses 6 and 7) in a state that the mounting part is in contact with the vehicle body, and the outer surface of the heat radiating member (8d), except the mounting part, faces the vehicle body with a clearance (12), in a state that the mounting part is fixed to the body (Fig. 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Hitachi by adding that the heat radiating member has a circuit board on a side opposite the heat radiating side in order to expose more of the surface area of the heat radiating member to the body of the vehicle to make the heat transfer more efficient without increasing expense.

29. Regarding claim 15, Aisin teaches that the surface of the mounting part (8a, 8b) which is to be in contact with the vehicle body (5) and the outer surface of the heat radiating member (8d) are substantially parallel to each other (Fig. 2).

30. Claims 3, 10, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hitachi and Aisin and further in view of Marks' Standard Handbook for Mechanical Engineers, Section 4.3 (hereinafter "Marks"). These three references, when considered together, teach all of the elements recited in claims 3, 10, and 16 of this application.

31. Regarding claim 3, Hitachi as modified by Aisin, as described above, teaches all the elements of claim 2, upon which this claim depends. However, claim 3 of this

Art Unit: 3749

application further discloses that the size of the clearance formed between the outer surface of the heat radiating member and a body surface is in the range of 3 mm and 20 mm. Hitachi as modified by Aisin does not contain this additional limitation.

32. Marks teaches that the size of the clearance (z) formed between the outer surface of the heat radiating member and a body surface (s_1s_2) *can be* in the range of 3 mm and 20 mm (page 4-64, Direct-View Factors and Direct Interchange Areas, equation for Case 1). It would have been an *obvious matter of optimization through routine experimentation* to modify the device of Hitachi as modified by Aisin to set the clearance in the range between 3 mm and 20 mm as taught by Marks since Hitachi shows an un-dimensioned clearance between the heat radiating member (2) and body surface (5), and one of ordinary skill in the art would desire to optimize the range to avoid having the electrical component vibrate against the body of the vehicle while maintaining efficient radiant heat transfer between them. MPEP 2144.05 II A.

33. Regarding claim 10, Hitachi as modified by Aisin, as described above, teaches all the elements of claim 1, upon which this claim depends. However, claim 10 of this application further discloses that the outer surface of the heat radiating member of the on-vehicle circuit unit and a surface of the body facing each other both have a radiance between 0.7 and 1.00. Marks teaches that the outer surface of the heat radiating member of the on-vehicle circuit unit (Aisin 8d) and a surface of the body (5) facing each other both can have a radiance (construed as emissivity) between 0.7 and 1.00 by merely choosing any of the engineering materials in that have the required radiance as taught by Marks or by painting the surface as taught in the Misc. I category therein. It

Art Unit: 3749

would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Aisin by choosing a material having a surface emissivity between 0.7 and 1.00 as taught by Marks in order to ensure efficient radiant heat transfer between the surfaces.

34. Regarding claim 16, Hitachi as modified by Aisin, as described above, teaches all the elements of claim 14, upon which this claim depends. However, claim 16 of this application further discloses that the clearance formed between the surface of the mounting part which is to be in contact with the body and the outer surface of the heat radiating member has a dimension within a range of 3 mm to 20 mm. Hitachi as modified by Aisin does not contain this additional limitation.

35. Marks teaches that the clearance (z) formed between the surface of the mounting part which is to be in contact with the body and the outer surface of the heat radiating member (s_1s_2) can have a dimension within a range of 3 mm to 20 mm (page 4-64, Direct-View Factors and Direct Interchange Areas, equation for Case 1). It would have been an *obvious matter of optimization through routine experimentation* to modify the device of Hitachi as modified by Aisin to set the clearance in the range between 3 mm and 20 mm as taught by Marks since Hitachi shows an un-dimensioned clearance between the heat radiating member (2) and body surface (5), and one of ordinary skill in the art would desire to optimize the range to avoid having the electrical component vibrate against the body of the vehicle while maintaining efficient radiant heat transfer between them. MPEP 2144.05 II A.

Art Unit: 3749

36. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hitachi and Aisin as applied to claim 4 above, and further in view of Byles (US 3,059,167) (hereinafter "Byles"). These three references, when considered together, teach all of the elements recited in claims 5 and 6 of this application.

37. Regarding claim 5, Hitachi as modified by Aisin, as described above, teaches all the elements of claim 4, upon which this claim depends. However, claim 5 of this application further discloses that the mounting part of the on-vehicle circuit unit is fixed to an inner surface of an engine room of the vehicle body in a state that it is in contact with the inner surface. Hitachi as modified by Aisin does not contain this additional limitation. Byles teaches that the mounting part (10) of the on-vehicle circuit unit (12) is fixed to an inner surface of an engine room of the vehicle body in a state that it is in contact with the inner surface (col. 3 lines 4 – 6). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Hitachi by adding that the mounting part of the on-vehicle circuit unit is fixed to an inner surface of an engine room of the vehicle body in a state that it is in contact with the inner surface as taught by Byles in order to protect the device from the elements.

38. Regarding claim 6, Hitachi as modified by Aisin, as described above, teaches all the elements of claim 4, upon which this claim depends. However, claim 6 of this application further discloses that the mounting part is fixed to a bottom surface of an engine room of the vehicle body in a state that the mounting part is in contact with the bottom surface. Hitachi as modified by Aisin does not contain this additional limitation. Byles teaches that the mounting part is fixed to a surface of an engine room of the

Art Unit: 3749

vehicle body in a state that the mounting part is in contact with the surface, but does not say that the surface is a *bottom* surface. However, it would have been an obvious matter of design choice to modify the device of Byles to fix the mounting part to a *bottom* surface of an engine room in a state that the mounting part is in contact with the *bottom* surface since the present application does not show that fixing the mounting part to the bottom surface, as opposed to any other surface, solves a particular problem or is for any specific purpose and because it appears that the device would function equally well in either configuration.

39. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hitachi and Aisin in view of Ono et al (US 5,045,971) (hereinafter "Ono"). These three references, when considered together, teach all of the elements recited in claim 17 of this application. In particular, Hitachi as modified by Aisin teaches that the mounting part (8a, 8b) extends from an edge of the heat radiating member (8) with the step, but does not disclose that the heat radiating member is formed of a metal plate.

40. Ono teaches that the heat radiating member is formed of a metal plate (col. 8 lines 35 – 39). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Hitachi by forming the heat radiating member of a metal plate as taught by Ono in order to provide a heat radiating plate that is strong enough to withstand vehicle environments and has good heat transfer characteristics.

Art Unit: 3749

41. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hitachi and Aisin in view of Dixon. These three references, when considered together, teach all of the elements recited in claims 12 and 13 of this application.

42. Regarding claim 12, Hitachi discloses a mounting structure for mounting an on-vehicle circuit unit on a vehicle body (Fig. 1), the on-vehicle circuit unit comprising a circuit board (PCB 4) having a power circuit (electronic control circuit 1), and a heat radiating member (radiator / heat sink 2) having a surface to which the circuit board is fixed in a state of enabling heat conduction (heat generating element which is heat-transmissibly coupled to a heat sink, p. 1 lines 10 - 12), and a surface functioning as a heat radiating surface (a heat sink for radiating the heat from the heat generating element, p. 1 lines 12 – 13), Hitachi does not disclose that the surface is an inner surface to which the circuit board is fixed and an outer surface functioning as a heat radiating surface, or that the on-vehicle circuit unit is mounted inside an engine room of the vehicle body in a state that the heat radiating member faces a surface of a battery provided inside the engine room, with a clearance being formed therebetween.

43. Aisin teaches that the surface is an *inner* surface (Fig. 2, 8c) to which the circuit board (11) is fixed and an *outer* surface (8d) functioning as a heat radiating surface (paragraph [0027]), and that the on-vehicle circuit unit (8) is mounted inside an engine room (4) of the vehicle body (Fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Hitachi by adding that the heat radiating member has a circuit board on a side opposite the heat radiating side and that the on-vehicle circuit unit is mounted inside an engine room as taught by Aisin in

order to expose more of the surface area of the heat radiating member to the body of the vehicle to make the heat transfer more efficient without increasing expense. Aisin does not teach that the heat radiating member faces a surface of a battery with a clearance being formed therebetween.

44. Dixon teaches that the heat radiating member (12) faces a surface of a battery (20) with a clearance (d_i) being formed therebetween (Fig. 1, col. 4 lines 24 – 39). It would have been obvious to one having ordinary skill in the art to modify the device of Hitachi by adding that the heat radiating member faces a surface of a battery with a clearance being formed therebetween as taught by Dixon in order to provide a thermally insulating air space between the circuit and the battery so that the battery does not overheat (col. 4 lines 36 – 39).

45. Regarding claim 13, Aisin teaches that the on-vehicle circuit unit is incorporated in a common electric connection box (ECU case 8) together with other circuit components (circuit board 11 containing the microcomputer, paragraph [0025]) in a state that the heat radiating member (8d) is exposed to the exterior (Fig. 2), and the entire electric connection box is mounted to a vehicle board (5, Fig. 2).

Conclusion

46. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Art Unit: 3749

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phillip E. Decker whose telephone number is (571)270-3088. The examiner can normally be reached on M - F, 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve McAllister can be reached on (571)272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Phillip E. Decker/
Examiner, Art Unit 3749

/Steven B. McAllister/
Supervisory Patent Examiner, Art Unit 3749